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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/028,570	12/19/2001	Achintya K. Bhowmik	42390P12640	3312

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EXAMINER
CALEY, MICHAEL H

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 03/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/028,570	BHOWMIK ET AL.	
	Examiner	Art Unit	
	Michael H. Caley	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 December 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Cordova-Plaza et al. (U.S. Patent No. 5,082,349 "Cordova Plaza").

Cordova-Plaza discloses a crystal fiber device having:

a first portion of a waveguide (Figure 12 element 242);

a second portion of a waveguide (Figure 12 element 244); and

a segment of crystal core fiber (Figure 12 element 240) coupling the first portion of the waveguide with the second portion of the waveguide.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-5, 7-9, 11-16, and 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ando et al. (U.S. Patent No. 5,694,496 "Ando") in view of Reule (U.S. Patent No. 4,634,215) and in further view of Sasaki (U.S. Patent No. 4,640,615).

Regarding claims 1, 11, 14, 19, Ando discloses:

a first portion of a waveguide (Figure 16 element 20, left side); and

a second portion of (Figure 16 element 20, right side);

Ando fails to disclose a segment of crystal core fiber coupling the first portion of the waveguide with the second portion of the waveguide. Reule, however, teaches the use of a rod lens, having a structurally equivalent configuration as an optical fiber with a cylindrical core and cladding, as an input and output means for a planar waveguide. Sasaki teaches such a rod lens as capable of polarizing light (Figure 4 element 27; Column 6 lines 45-47), performing the same function as the optical waveplate disclosed by Ando.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized separate polarizing lenses such as GRIN SELFOC ™ lenses in the construction of the array waveguide grating disclosed by Ando. Reule teaches rod lenses as having an optimal coupling capability with a planar waveguide, which are used as both a transmitting medium and receiving medium in correspondence with the planar waveguide. One would have been motivated to use such a rod lens as the polarizing medium in the array waveguide to overcome coupling inefficiencies of the planar waveguide with the waveplate. Rod lenses are used extensively in the art as efficient collimating means as input to and output from a planar waveguide. Use of such a polarizing rod lens would have been advantageous to maximize the coupling efficiency between the two portions of waveguide.

Regarding claims 2, 12, 16, and 20, Ando, Reule, and Sasaki fail to explicitly mention the use of an optical index-matching gel disposed between the segment of crystal core fiber and the first portion and second portion of the waveguide. The Examiner takes Official notice that the use of index matching gel to interconnect a planar waveguide and a rod lens or optical fiber is

old and well known in the art as a means of creating a fixed positional relationship between the optical elements while minimizing the scattering of light between them.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used an optical index matching gel to secure the rod lens between the two waveguides in the array waveguide grating disclosed by Ando as modified. The use of such an adhesive would have been motivated by a desire to maintain a fixed relationship between the elements while minimizing the scattering of light, improving the coupling efficiency.

Regarding claims 3 and 15, Ando discloses the optical element as disposed at approximately a 45-degree angle with the planar lightwave circuit (Column 5 lines 53-63).

Regarding claim 4, Ando discloses the planar lightwave circuit as an array waveguide grating (Figure 16).

Regarding claim 5, Ando discloses the optical element as disposed at a mid section of the array waveguide grating.

Regarding claims 7 and 21, it would have been inherent that the rod lens have a length that satisfy the proposed equation in order to perform the same function as a half wave plate at a 45 degree angle with the planar lightwave circuit.

Regarding claims 8 and 22, due to the congruency of structure, it would have been inherent that the optical communication waveband range is approximately 800 nm to 1700 nm.

Regarding claim 9, optical element is disclosed as constructed from an inorganic substance.

Claims 6 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ando in view of Reule and Sasaki and in further view of Sauter (U.S. Patent No. 5,218,654).

Ando, Reule, and Sasaki fail to disclose the optical element as disposed in a V-groove substrate. Sauter, however, teaches the use of a V-groove in a substrate to accurately place a rod lens (Figure 2 elements 54 and 92).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have placed the rod lens in a V-groove in the substrate of the planar waveguide of Ando's array waveguide grating. Such a placement would have been motivated by a desire to most efficiently couple the rod lens with the waveguide as is old and well known in the art as a placement means for cylindrical elements such as fibers and rod lenses.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ando in view of Reule and Sasaki and in further view of Dyott et al. (U.S. Patent No. 4,077,699 "Dyott").

Ando, Reule, and Sasaki fail to disclose the crystal core fiber as comprising an organic or polymeric substance. Dyott, however, teaches the use of a crystal core waveguide constructed of an organic substance (Column 5 lines 4-16).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have constructed the optical element as an organic substance. Such a substance would have been an effective substance to create the required polarization in the application disclosed by Ando. In such a case, it would have been an engineering expediency to use such a material of construction based on the expected results as are old and well known in the art.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 5,414,548 to Tachikawa et al. as an alternate embodiment of an array waveguide grating with a crystal core fiber.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael H. Caley whose telephone number is (703) 305-7913. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

mhc
March 20, 2003

SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800